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(56) Documents cited

GB 1526409	US 4439935
GB 1446769	US 4420894
GB 1328765	US 4377042

(58) Field of search
A3B

(54) Footwear

(57) The article of footwear has an upper 1 secured to a mid-sole 2 whose lower surface is provided with hooks 7 or other means for temporarily attaching a member or members to form a sole-and-heel structure.

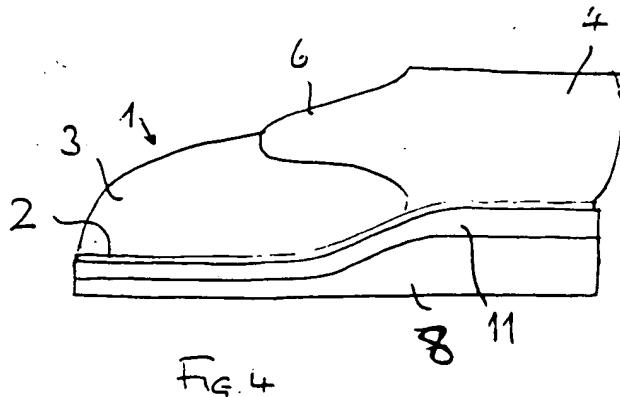


Fig. 4

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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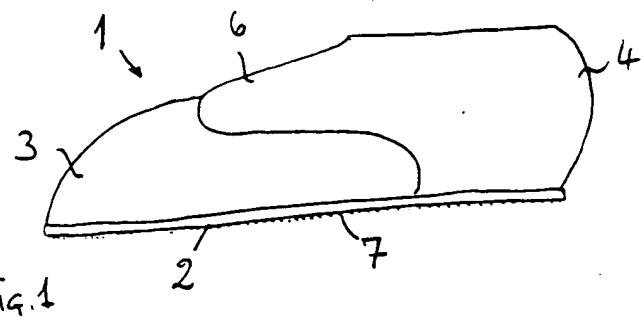


Fig. 1

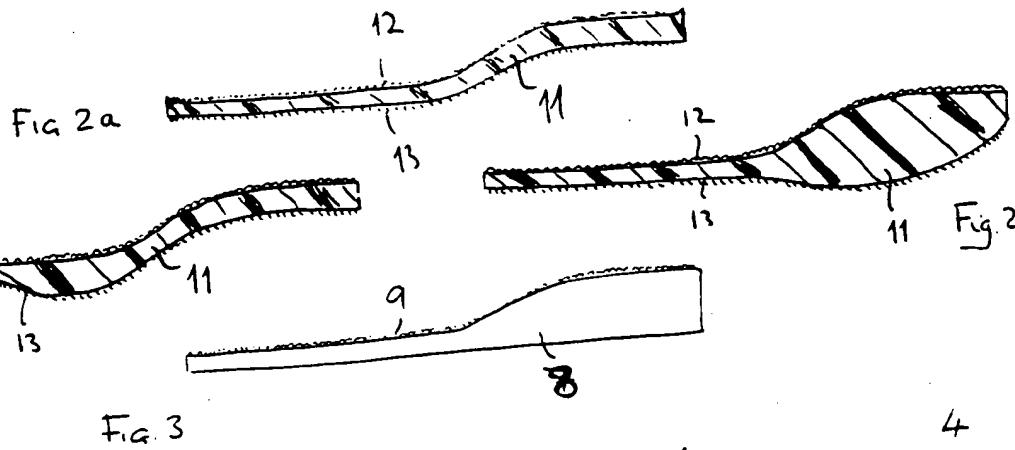


Fig. 2a

Fig. 2b

Fig. 2c

Fig. 3

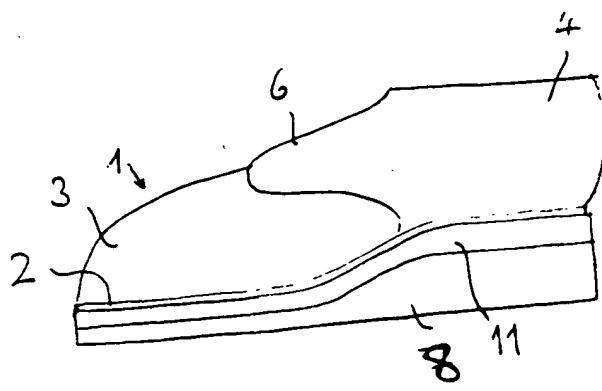


Fig. 4

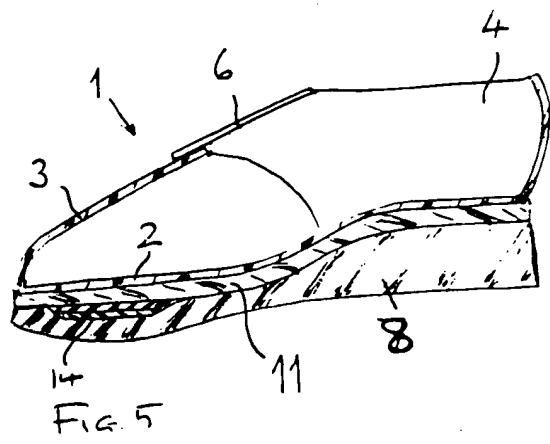


Fig. 5

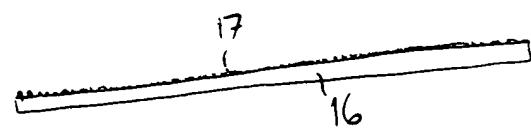


Fig. 6

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SPECIFICATION
Footwear

This invention relates to footwear, particularly but not solely footwear for medical use, e.g.

5 orthopaedic shoes and post-operative footwear. There is a need for footwear, particularly orthopaedic footwear, which can readily be assembled and/or adapted to suit the wearer. My U.K. patent 1 581 999 (U.S. Patent 4 120 101)

10 discloses an article of orthopaedic footwear having an upper of thermosoftening plastics material with a lining of resilient expanded thermosoftening plastics material of closed cell construction, secured to a sole. The article can be shaped to accommodate deformities of the wearer's foot, by forming and/or cutting the upper. However, it would be difficult for unskilled or semi-skilled paramedical personnel to make up such an article of footwear to suit the wearer, since modifications in the sole region are frequently necessary. To overcome this problem in orthopaedic footwear my U.K. Patent 2 045 597 discloses an orthopaedic shoe kit comprising upper units of different sizes, each having a mid-sole bonded to an upper, intermediate units of different sizes, each having a peripheral lip for locating a respective one of the mid-soles of the upper units, sole-and-heel units of different sizes, each having a peripheral contour substantially identical to that of the respective one of the intermediate units, and

25 adaptation inserts for insertion between the mid-sole and the sole-and-heel unit. In using this kit the various units and inserts (if necessary) are selected to suit the wearer and then bonded permanently together. Although this kit makes it easy to construct orthopaedic footwear, the resulting article can only be modified to a limited extent after being finished; if it is found that the assembled footwear does not in fact correctly accommodate deformities or give the best functional dynamic effect, then it must be

30 discarded and a new item made up.

The present invention provides an article of footwear comprising an upper secured to a mid-sole, in which the lower surface of the sole is provided with means for temporarily attaching to the said lower surface a member or members to form a sole-and-heel structure.

35 Using this article and temporarily attaching, for example, an insert or inserts and a ground-engaging member to the lower surface of the mid-sole, a shoe, or the like can readily be built up to suit the wearer. The shoe can then be tried out by the wearer and, if it requires alteration, it can be simply taken apart and then reconstructed with different inserts and/or a different ground-engaging member.

40 The article also enables footwear to be made for temporary use, e.g. as post-operative footwear or for gait assessment.

The invention also provides a footwear kit comprising (a) a plurality of upper units of different sizes, each comprising a flexible mid-sole bonded to an upper, (b) a plurality of members of different sizes, shapes, and thicknesses for attachment to the mid-sole, and (c) means for temporarily attaching the said members to the lower surface of the mid-

45 sole. The said members may be inserts, e.g. to provide wedge or rocker effects, sole-and-heel units, and intermediate units for interposition between a mid-sole and a sole-and-heel unit. Preferably, means are also provided for temporarily attaching selected ones of the said members to one another, e.g. an intermediate unit to a sole-and-heel unit.

50 The means for temporarily attaching a further member or members to the mid-sole may, for example, be constituted by a weak adhesive or by mechanical elements which are connectable with and readily disengageable from cooperating elements provided on the said member or members. Before use, the adhesive may be covered by a strippable protective foil to prevent contamination of the adhesive. The preferred mechanical elements are burrs or hooks which are capable of releasably engaging loops on the said member or members; material having said burrs or hooks is sold under the trade mark "Velcro".

55 The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side view of an article of footwear;

Figures 2a to 2c are sections through respective intermediate units for use with the article, respectively for compensation of leg length difference for providing a mid-sole distal mid-foot rocker, and for providing a mid-sole proximal mid-foot rocker;

Figure 3 is a side view of a sole-and-heel unit for use with the article;

Figure 4 is a side view of a shoe made up of the items shown in Figures 1, 2a, and 3;

Figure 5 is a section through a modified shoe, including inserts constituting a fore-part wedge; and

Figure 6 is a side view of another sole-and-heel unit for use with the article (with or without the unit of Figure 2c).

The footwear article shown in Figure 1 comprises an upper 1 and a flexible mid-sole 2. The upper 1 has a forepart 3 of PVC (polyvinylchloride) bonded to a backing of textile material which is in turn bonded to a lining of low density "Plastazote" (a trade mark for an expanded cross-link polyethylene). The hindpart 4 of the upper is either identical in construction to the forepart or is of leather or synthetic leather. It includes a pair of wings 6 for closure over the foot and is stitched or bonded (e.g. welded) to the forepart 3.

The mid-sole 2, e.g. of polyurethane, is bonded to the underside of the upper 1, preferably by being moulded in situ. The mid-sole may be

100 discontinuous, i.e. made up of separate longitudinal or transverse sections; together with congruent upper components, an adjustable fitting system for gross abnormalities may be achieved.

105 Over the whole, or at least the major part, of its area the lower surface of the mid-sole 2 is provided with means for temporarily attaching the said lower surface to a further member or members (such as those shown in Figures 2a to c, 3, and 6). In the preferred embodiment illustrated, the temporary

attachment means comprises "Velcro" hook material 7, in the form of a sheet or a number of strips, secured to the lower surface of the mid-sole 2. The hooks are capable of releasably engaging other material having loops or hooks, such as "Velcro" loop material, knitted material, or terry. A sole-and-heel unit 8 for direct or indirect attachment to the mid-sole 2 is shown in Figure 3. The unit 8 is, for example, of polyurethane or rubber and is preferably continuous lengthwise, breadthwise, and in its thickness. Its upper surface is provided with "Velcro" loop material 9 secured to it. The loop material 9 can be releasably attached to the hook material 7, thereby temporarily attaching the unit 8 to the mid-sole 2.

Figures 2a to c each show an intermediate unit 11 (e.g. of polyurethane) which can be interposed between the mid-sole 2 and the sole-and-heel unit 8. Its upper surface is provided with "Velcro" loop material 12 and its lower surface with "Velcro" hook material 13. The complete shoe with the intermediate unit 11 of Figure 2a is shown in Figure 4. This can be fitted on the intended wearer's foot and the wearer can walk in the shoe in order to check whether modification of the shape or construction is necessary. If so, the three parts of the shoe can be taken apart again and be replaced, added to, or modified (e.g. by cutting or shaping). If, for example, a wedge or rocker effect is found to be desirable, this can be achieved by using a different intermediate unit 11 or inserting an adaptation insert 14 between the intermediate unit 11 and the sole-and-heel unit 8. The insert 14 is built up of polyurethane sheets, whose edges are rounded off or bevelled. It need not adhere to the unit 11 or the unit 8, since it is surrounded by the two units and therefore adequately located by them.

Once the wearer and the qualified personnel are satisfied that a satisfactory shape and construction of the shoe have been achieved, the parts of the shoe can be permanently secured together, e.g. by application of adhesives and/or by high-frequency welding (diathermy), or similar modules can be made up as a permanent walking shoe. In fact, additional permanent securing is not essential, since the "Velcro" connection is sufficiently tenacious to maintain the integrity of the shoe.

Figure 6 shows an alternative form of sole-and-heel unit 16 for temporary attachment to the mid-sole 2 to provide a soft shoe or slipper, e.g. for post-operative wear.

The unit 16 is made of "Plastazote" and its upper surface has a layer of "Velcro" loop material 17 secured to it. An intermediate unit, such as that shown in Figure 2c, may be interposed between the mid-sole 2 and the unit 16, if desired.

A complete footwear kit can comprise a plurality of the items shown in Figures 1, 2a to c, 3, and 6, of different shapes and sizes, as well as various adaptation inserts. The kit may also include caliper receiving stubs as described in my U.K. patent specification 2 045 597.

Various modifications may be made within the scope of the invention. For example, the hook materials and loop materials described above may

be exchanged for each other (e.g. the mid-sole 2 may bear loop material and the sole-and-heel units 8, 16 may bear hook material). Other forms of temporary mechanical connection than hook-and-loop may be used: for instance, a multiplicity of plugs may snap fit in matching holes. As mentioned previously, a weak adhesive may be used instead of mechanical connection. A layer of weak adhesive may be spread on one of the surfaces to be temporarily connected. Alternatively, a double-sided adhesive foil or tape may be used; this can be removed subsequently, before the parts are permanently bonded together. By suitable chemical composition of the various parts and units which are to be temporarily attached to one another, it may be possible to make their surfaces sufficiently sticky to provide mutual adhesion without the application of a separate layer of adhesive or material.

CLAIMS

- 5 1. An article of footwear comprising an upper secured to a mid-sole, in which the lower surface of the mid-sole is provided with means for temporarily attaching to the said lower surface a member or members to form a sole-and-heel structure.
- 10 2. An article as claimed in claim 1, in which the said means comprises a weak adhesive.
- 15 3. An article as claimed in claim 2, in which the adhesive is covered by a strippable protective foil.
- 20 4. An article as claimed in claim 1, in which the said means comprises mechanical elements which are connectable with and readily disengagable from cooperating elements on the said member or members.
- 25 5. An article as claimed in claim 4, in which the mechanical elements are burrs or hooks which are capable of releasably engaging loops on the said member or members.
- 30 6. A footwear kit comprising (a) a plurality of upper units of different sizes, each comprising a flexible mid-sole bonded to an upper, (b) a plurality of members of different sizes, shapes, and thicknesses for attachment to the mid-sole, and (c) means for temporarily attaching the said members to the lower surface of the mid-sole.
- 35 105 7. A kit as claimed in claim 6, in which means are provided for temporarily attaching selected ones of the said members to one another.
- 40 8. A kit as claimed in claim 6 or 7, in which the said members include sole-and-heel units and intermediate units for interposition between a mid-sole and a sole-and-heel unit.
- 45 110 9. An article of footwear substantially as described with reference to, and as shown in, Figure 1 of the accompanying drawings.
- 50 115 10. A footwear kit substantially as described with reference to, and as shown in, the accompanying drawings.
- 55 120 Superseded claims —
New claim:— 11
- 60 125 11. A method of making an article of orthopaedic footwear using a footwear kit comprising (a) a plurality of upper units of different sizes, each

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comprising a flexible mid-sole bonded to an upper,
(b) a plurality of members of different sizes, shapes,
and thickness for attachment to the mid-sole, and (c)
means for temporarily attaching the said members
5 to the lower surface of the mid-sole, the method
comprising: assembling from the kit a temporary
article of orthopaedic footwear for a given wearer,
the temporary article comprising an upper unit and
at least one said member temporarily attached
10 thereto by the said means; walking the wearer in the
temporary article and checking whether
modification of the article is needed; if necessary,
modifying the temporary article to suit the wearer;
and then either permanently securing the parts of
the temporary article together or making up similar
parts into an identical article in which the parts are
permanently secured together, thereby forming a
permanent article of orthopaedic footwear.

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